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AUTOMATED, HIGH-THROUGHPUT IMAGING DURING CELL LINE DEVELOPMENT TO INCREASE THE ASSURANCE OF CLONALITY

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Current methodologies to create monoclonal cell lines include limiting dilution or single-cell sorting at conditions that offer statistical assurance of monoclonality. We have implemented an automated, high-throughput imaging workflow that acquires brightfield and fluorescent images of every well during the single-cell cloning process. These images can provide direct evidence on whether the cell line originated from one cell during the cloning step. Characterization of the workflow was completed, including the effect of fluorescent dye on cell culture, effect of exposure to high intensity light on cell culture and rate of random mutagenesis in the presence of fluorescent dye and high intensity light exposure. Further characterization by fluorescent cell mixing experiments, either with host cells which do not express protein product or fluorescent hosts that express antibody protein, were carried out to determine the rate of error of our automated, high-throughput imaging workflow. Case study data will be presented that describes the challenges in the development of this workflow and the solutions that were implemented.